SEUNG-BIN JOO

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EDUCATION

- **University of Oxford - Wadham College** *Oct 2021 - June 2025*
  MEng Engineering Science (Specialization in Artificial Intelligence, Robotics, Computer Vision) Oxford, United Kingdom
  - Projected First Class Honors (mean mark 78/100 in Year 3, top 15% of cohort)
  - Selected coursework: Deep Learning; Deep Reinforcement Learning; Graph Machine Learning; Computer Vision & Robotics; Responsible, Explainable, & Multi-modal AI; Software Engineering; Information Engineering; Optimal and Learning-based Control; Computing Technology; Medical Imaging & Informatics; Machine Learning
  - Wadham College International Officer, Wadham Basketball Team, Wadham College Men's Rowing, OUKS Football

EXPERIENCE

- **Oxford Visual Geometry Group (VGG)** *Sept 2024 - Present*
  Master's Student Researcher - advised by Dr. João Henriques Oxford, United Kingdom
  - Using Rapid Motor Adaptation (RMA), reinforcement learning (RL), and depth-CNNs to achieve generalizable manipulation with bimanual robots, and integrating vision-language model feedback to bimanual RMA policy
- **Oxford Robotics Institute - Goal-Oriented Long-Lived Systems (GOALS) Lab** *June 2024 - Nov 2024*
  EPSRC Research Intern - advised by Prof. Nick Hawes Oxford, United Kingdom
  - Developed differentiable particle filters (DPF) for belief dynamics learning in contact-rich robot manipulation tasks
  - Utilized supervised learning & novel "negative proposing" neural network to reduce DPF error by a factor of 3.67
- **UCL Electrochemical Innovation Lab (EIL)** *July 2023 - Sept 2023*
  Faraday Institution Intern - advised by Prof. Rhodri Jervis and Prof. James Robinson London, United Kingdom
  - Built unsupervised and supervised machine learning models to estimate the state of health of cylindrical lithium-ion batteries using acoustic emission data. Using deep neural networks and autoencoders, achieved up to 93.8% classification accuracy, and correlated model results with empirical data from X-Ray Computed Tomography.
- **Oxford Robotics & Additive Manufacturing Society (OxRAM)** *June 2022 - July 2023*
  Quadruped Robot Project (QRONK) Co-Lead Oxford, United Kingdom
  - Led a team of 13 engineers to create Oxford's first student-made 3D-printed 12 degree-of-freedom quadruped robot.
  - Designed 12-DOF quadruped in Fusion 360, processed pose data through Kalman filtering, and implemented MPC.
- **Seoul National University Biorobotics Laboratory (SNU BRL)** *June 2022 - Sept 2022*
  Undergraduate Researcher - advised by Prof. Kyujin Cho Seoul, South Korea
  - Designed a pneumatic system which controls pressure inside an under-foot dynamic-cushion soft robot that reduces ground reaction force during running. Implemented PID and LQR controllers to various pneumatic circuits
- **Oxford University Racing (OUR)** *Aug 2022 - June 2023*
  Chief Powertrain Engineer Oxford, United Kingdom
  - Fixed gearbox oil leakage, reassembled the motor gearbox systems, and led the design and FEA of new motor mounting plates in Oxford University's electric racecar. Mechanically redesigned the high voltage junction box (HVJB) and tractive system. Manufactured and installed powertrain components onto the car

SELECT PROJECTS AND PUBLICATIONS

- **Design of Holographic Optical Tweezers for Advanced Single Cell Surgery Photonics Platform**
  - Using ray optics MATLAB simulations, Brownian optical trap calculations, and the Gerchberg-Saxton phase retrieval algorithm, designed parallelizable optical tweezers for dynamically manipulating single cells
- **Sonic Cityscapes: An Analysis of New York's Unique Sound Identity Using Artificial Intelligence**
  - Chosen competitively as one of 5 Wadham students to undertake fully-funded research project in New York
  - Designed audio classification pipeline using MFCC feature extraction and constructed deep neural networks capable of classifying various street sounds from New York and Oxford with 98.0% accuracy

[1] Joo, et al. (2024). **Investigating the Performance and Safety of Li-Ion Cylindrical Cells Using Acoustic Emission and Machine Learning Analysis**. *Journal of The Electrochemical Society*. DOI: 10.1149/1945-7111/ad59c9

SCHOLARSHIPS AND AWARDS

- **Kwanjeong Scholarship:** $220,000 full-ride scholarship given to top 4 high school students in South Korea
- **Wadham College Undergraduate Scholarship:** 3 consecutive scholarships for excellence in Oxford exams
- **EPSRC Vacation Funding Award:** competitive research funding given to less than 15 Oxford STEM students
- **France Brain Bee Champion:** first place in France's premier neuroscience competition; was national representative
- **Breakthrough Junior Challenge Finalist:** top 15 in global science communication contest with 12,000+ students

SKILLS

- **Technical:** Python, PyTorch, TensorFlow, C++, ManiSkill, Sapien, MATLAB, Fusion 360, SolidWorks, Git, LaTeX
- **Language:** bilingual in English and Korean, limited proficiency in French and German